

CLAIMS

What is claimed is:

1. A photocell comprising:
 - a photo element having an emitter terminal and a base terminal to generate a current according to an incident light signal;
 - a charging capacitor to discharge current charged therein when the light signal is inputted to the photo element;
 - 10 a voltage control circuit connected to the emitter terminal of the photo element to maintain a voltage of the emitter terminal of the photo element constant; and
 - 15 at least one voltage stepping element connected to the voltage control circuit to step the voltage of the emitter of the photo element by a predetermined segment.
2. The photocell of claim 1, wherein the photo element comprises a photo receptor to receive the light signal, and a current amplifier, and the photo receptor is connected to
 - 20 the base terminal of the current amplifier.
3. The photocell of claim 1, wherein the voltage of the base terminal of the photo element linearly varies according to a variation of a voltage of the emitter
 - 25 terminal of the photo element.
4. The photocell of claim 1, further comprising:
 - a reset unit to reset the charging capacitor to charge the charging capacitor.
- 30 5. The photocell of claim 1, further comprising:

a constant current source connected to the voltage control circuit to supply a constant current to the photo element.

5 6. The photocell of claim 1, wherein the voltage stepping element comprises a MOS transistor having a drain terminal and a gate terminal connected to each other.

10 7. The photocell of claim 1, wherein the voltage stepping element comprises a diode.

8. The photocell of claim 1, wherein the voltage stepping element comprises a plurality of sub-voltage stepping elements connected in series.

15 9. The photocell of claim 1, wherein the voltage control circuit comprises a first MOS transistor and a second MOS transistor, a drain terminal of the first MOS transistor is connected to a gate terminal of the second MOS transistor, and a gate terminal of the first MOS transistor is connected to a source terminal of the second MOS transistor and an emitter terminal of the photo element.

25 10. A photocell comprising:
a photo element having an emitter terminal and a base terminal to generate a current according to an incident light signal;

30 a charging capacitor to discharge current charged therein when the light signal is inputted to the photo element;

a voltage control circuit connected to the emitter terminal of the photo element to maintain a voltage of the emitter terminal of the photo element constant;

5 at least one voltage stepping element connected to the voltage control circuit to step the voltage of the emitter of the photo element by a predetermined segment; and

a shutter to control a discharging characteristic of the charging capacitor according to strength of light incident on the photo element.

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11. The photocell of claim 10, wherein the photo element comprises a photo receptor to receive the light signal, and a current amplifier, and the photo receptor is connected to the base terminal of the current amplifier.

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12. The photocell of claim 10, wherein the voltage of the base terminal of the photo element linearly varies according to a variation of a voltage of the emitter terminal of the photo element.

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13. The photocell of claim 10, further comprising:
a reset unit to reset the charging capacitor to charge the charging capacitor.

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14. The photocell of claim 10, further comprising:
a constant current source connected to the voltage control circuit to supply a constant current to the photo element.

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15. The photocell of claim 10, wherein the voltage stepping element comprises a MOS transistor having a drain terminal and a gate terminal connected to each other.

16. The photocell of claim 10, wherein the voltage stepping element comprises a diode.

17. The photocell of claim 10, wherein the voltage stepping element comprises a plurality of sub-voltage stepping elements connected in series.

18. The photocell of claim 10, wherein the voltage control circuit comprises a first MOS transistor and a second MOS transistor, a drain terminal of the first MOS transistor is connected to a gate terminal of the second MOS transistor, and a gate terminal of the first MOS transistor is connected to a source terminal of the second MOS transistor and an emitter terminal of the photo element.

19. The photocell of claim 10, wherein the discharging characteristic of the charging capacitor is a first speed when the strength of the light incident on the photo element is in a first state, and the discharging characteristic of the charging capacitor is a second speed slower than the first speed when the strength of the light incident on the photo element is in a second state weaker than the first state.

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20. An automatic gain control method of a photocell, the method comprising:

generating a current according to an incident light signal in a photo element having an emitter terminal and a base terminal;

discharging current charged in a charging capacitor when the light signal is inputted to the photo element;

maintaining a voltage of the emitter terminal of the photo element constant in a voltage control circuit connected to the emitter terminal of the photo element; and
5 controlling the voltage of the emitter of the photo element to be constant in at least one voltage stepping element connected to the voltage control circuit.

21. The automatic gain control method of claim 20, wherein the maintaining of the voltage comprises
10 maintaining a voltage of the base terminal of the photo element constant.

22. The automatic gain control method of claim 20, wherein the voltage of the base terminal of the photo
15 element linearly varies according to a variation of the voltage of the base terminal of the photo element.

23. The automatic gain control method of claim 20,
further comprising:
20 charging the charging capacitor according to a reset signal.

24. The automatic gain control method of claim 20,
further comprising:
25 reading a voltage generated from the charging capacitor after the discharging of the charging capacitor is completed.

25. An automatic gain control method of a photocell,
30 the method comprising:
generating a current according to an incident light signal in a photo element having an emitter terminal and a base terminal;

discharging current charged in a charging capacitor when the light signal is inputted to the photo element;
controlling a discharging time of the charging capacitor according to the light signal in a shutter;
5 maintaining a voltage of the emitter terminal of the photo element constant in a voltage control circuit connected to the emitter terminal of the photo element; and
controlling the voltage of the emitter of the photo element to be constant in at least one voltage stepping
10 element connected to the voltage control circuit

26. The automatic gain control method of claim 25, wherein the maintaining of the voltage comprises maintaining a voltage of the base terminal of the photo
15 element constant.

27. The automatic gain control method of claim 25, wherein the voltage of the base terminal of the photo element linearly varies according to a variation of the
20 voltage of the base terminal of the photo element.

28. The automatic gain control method of claim 25, further comprising:
charging the charging capacitor according to a reset
25 signal.

29. The automatic gain control method of claim 25, wherein the charging capacitor is discharged when a shutter signal is a first state in the shutter, and the discharging
30 of the charging capacitor is stopped when the shutter signal is a second state in the shutter.

30. The automatic gain control method of claim 25,
further comprising:

reading a voltage generated from the charging
capacitor after the discharging of the charging capacitor
5 is completed.